SCALES

IN TEXTILES

2025

ArcInTex
Beyond e-Textiles
Aalto University

SCALES
IN TEXTILES

AALTO UNIVERSITY

APRIL 8-10, 2025

EDITORS

Emmi Pouta
Kirsi Niinimäki
Jaana Vapaavuori
Maija Vaara
Giulnara Launonen
Elina Onkinen
Pirjo Kääriäinen
Mithila Mohan

GRAPHIC DESIGN

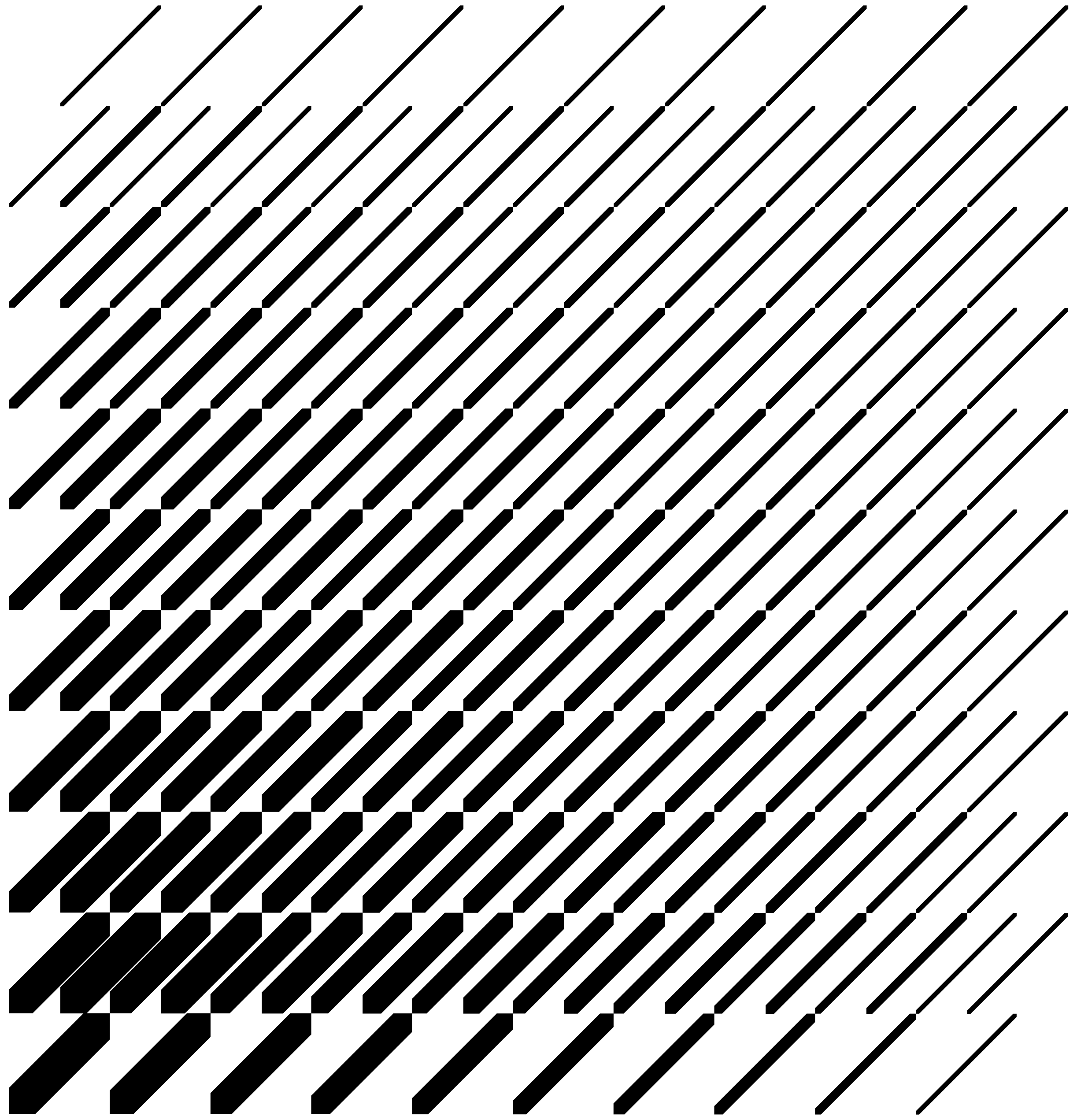
Mithila Mohan

ISBN 978-952-64-9668-9 (PDF)

http://urn.fi/URN:ISBN:978-952-64-9668-9

Unigrafia Oy
Helsinki
2025

TABLE OF CONTENTS



SCALES IN TEXTILES

The conference is hosted by Aalto University, bringing together the ArcInTex network and the Beyond e-Textiles project. This conference explores the multiple scales inherent in textile innovation - whether through physical scales, from nanomaterial manipulation and fiber development to the integration of textiles into wearable technologies and extensive IoT systems, or through temporal scales, as we rethink material life cycles and longevity. It also challenges us to reflect on the balance within our research choices: how we weigh and prioritize competing needs, and how we bring together perspectives that range from the generalisable to the deeply personal.

ArcInTex

ArcInTex is a network where Architecture, Interaction Design and Textiles join forces in developing ideas, techniques, methods and programs for new perspectives on design for building, dwelling and living and do so through joint research projects, joint applications for funding larger projects, exchange programs on the Master and research levels, and joint conferences and workshop on emergent topics.

Beyond e-Textiles

Beyond e-Textiles is a Nordic network on smart light-conversion textiles beyond electric circuits. The project aims to unlock the full commercial potential of smart textiles by opening up ways for light-powered textiles that can find uses, for instance, as sunshine-based dry cleaning or disinfecting of clothes, UV-powered water purification nets, light-collecting tents, and incident irradiation adaptable window shades/curtains. Overall, our goal is to bring together critical mass and to form a network to serve particularly Nordic industries that could benefit from progress in smart textiles. Moreover, we aim to enhance Nordic integrity in exchanging the best practices of teaching design thinking, as well as facilitating interdisciplinary collaboration between scientists, engineers, designers and artists.

PERSPECTIVES FROM INTERACTION DESIGN TO RESPONSIVE TEXTILE DESIGN

HANNA LANDIN

University of Borås

Hanna Landin is a senior lecturer in interaction design at the Swedish School of Textiles, University of Borås. In her work she explores the aesthetics of interaction with regard to the design process, searching for a rich understanding of how we can design the way we live.

In the Beyond e-Textiles project material research is combined with design explorations looking at the possibilities of solar radiation as a source to initiate change in textiles. Solar radiation of visible light and, to humans' eyes, non-visible ultraviolet (UV) radiation, can trigger visual and structural changes in textiles. One question is how we can perceive solar radiation through textile objects, leading to the question if another perception can make us more aware of the not man-made parts of the world.

In the project different design explorations have been made using light-emitting, shape-changing, colour-changing and light-transporting yarns. With the help of solar radiation, textiles made with these yarns can radiate their own light, expand and condense shape, reveal colours and convey visible light. The knitted and woven textiles have been explored from a first-person perspective both indoors in lab and domestic interior settings, as well as in outdoor environments. The expressional properties of the textiles have been looked at in relation to solar radiation as the determining factor leading to the textile's expressional outcome, and the textile as the site of material interaction that reveals the sun's both visible and non-visible radiation.

Mittens were chosen the be knitted as a textile object that could be carried throughout the day while being exposed to the outdoor environment. The mittens have UV-colour changing yarn on the top, knitted in a traditional Scandinavian pattern, and light-emitting yarn on the palm. The top of the mittens transition from light green in a non-activated state to white when semi-activated, and then light purple when fully activated. On the palm, a star pattern emerges as the mittens move from light exposure to a darker environment. The mittens were worn daily in February and March in Sweden.

Familiarizing with the design pieces took time, as initial ideas of their behaviour were not always accurate. For example, in a lab setting, the middle state white colour on the mittens was expected to be a brief transitional phase between green and purple. However, in Scandinavian winter season, white was a more common colour, with purple appearing only occasionally on certain days. Surprisingly, the mittens sometimes remained green even under what was perceived as strong visible daylight. Additionally, it was clear that the mittens were more affected by the UV radiation from above rather than from the direction of the sun. Using them led to a better understanding of ultraviolet radiation. Further work is needed to reveal whether a change in the perception of solar radiation might increase awareness of existing natural cycles and interconnections in the world, and to better link humans to the non-human.